Title: Relaxed SiGe Platform for High Speed CMOS Electronics and High Speed Analog Circuits
Inventor: Fitzgerald
Serial No.: Not Yet Assigned
Atty Docket No.: ASC-049C1
Atty: Mark L. Beloborodov
Express Mail Mailing Label No.: EL 988705761 US
Formal Drawing Sheet 1 of 17

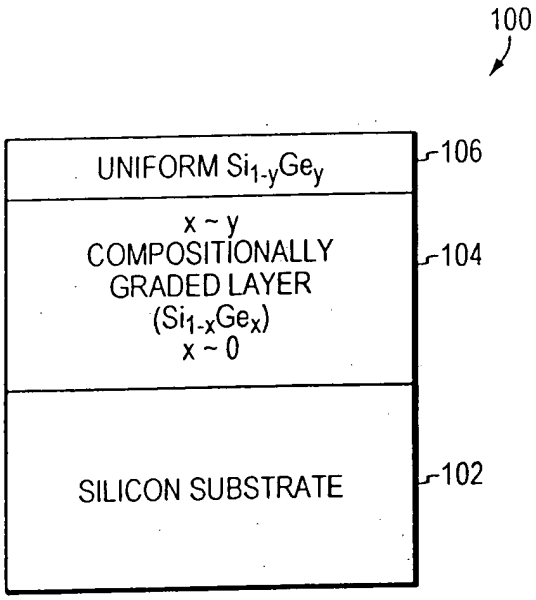

FIG. 1

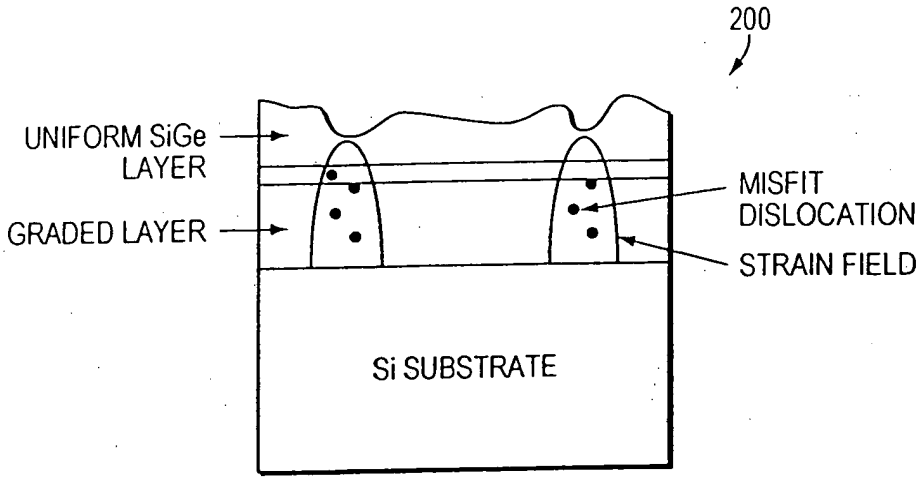
200
UNIFORM SiGe LAYER
GRADED LAYER
MISFIT DISLOCATION
STRAIN FIELD
Si SUBSTRATE

FIG. 2

TYPE OF SURFACE	AVERAGE ROUGHNESS (nm)
AS-GROWN GRADED COMPOSITION RELAXED SiGe	7.9
PLANARIZED SiGe	0.57
REGROWTH SiGe, LATTICE-MATCHED	~0.6
REGROWTH SiGe, LIGHT MISMATCH, THICKNESS = 1.5 μm	0.77

FIG. 3

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Formal Drawing Sheet 4 of 17

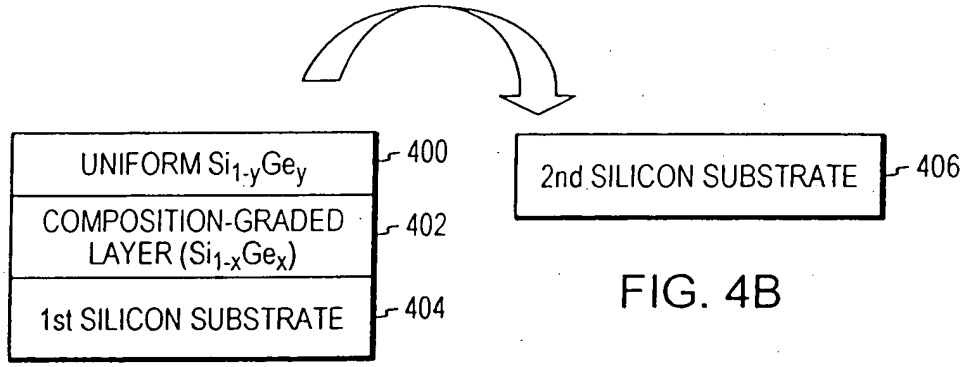

FIG. 4A

FIG. 4B

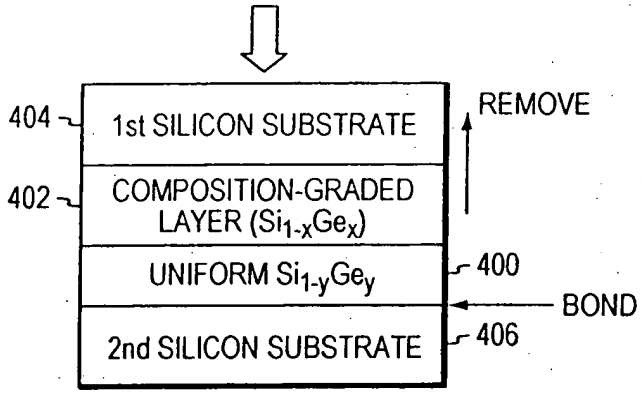

FIG. 4C

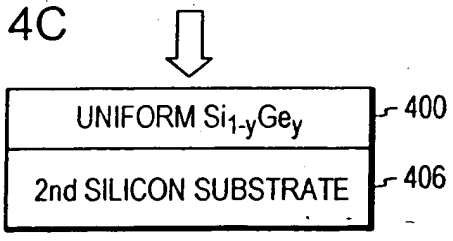

FIG. 4D

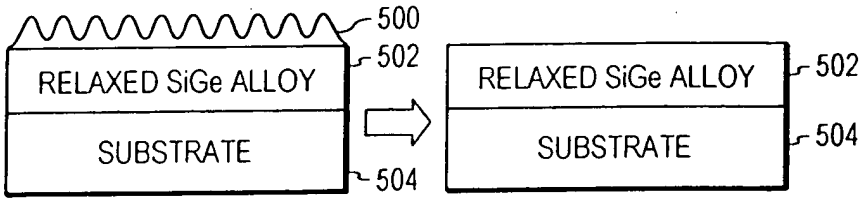

FIG. 5A

FIG. 5B

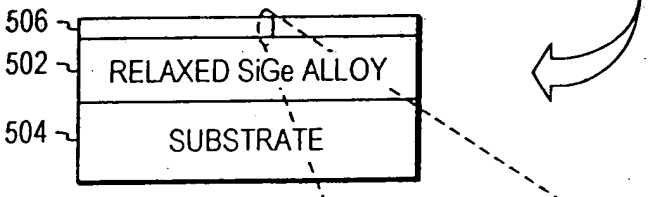

FIG. 5C

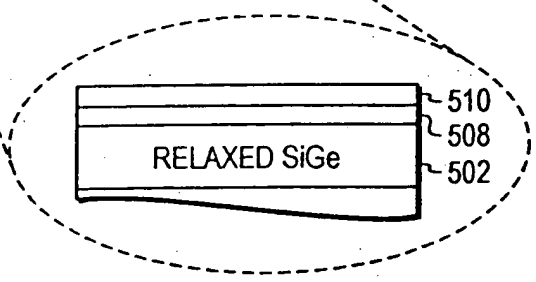

FIG. 5D

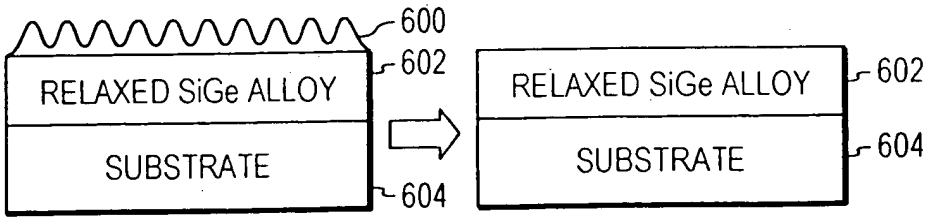

FIG. 6A

FIG. 6B

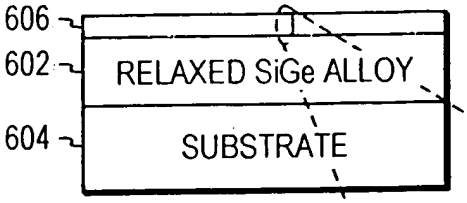

FIG. 6C

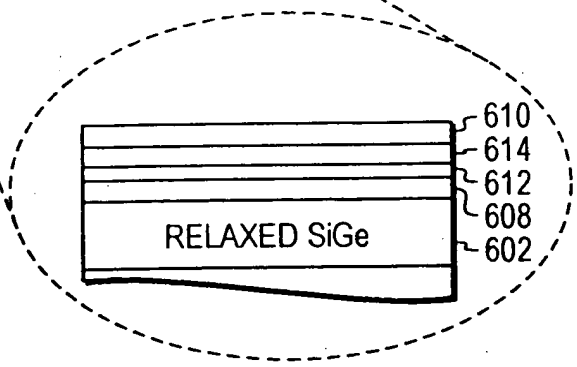

FIG. 6D

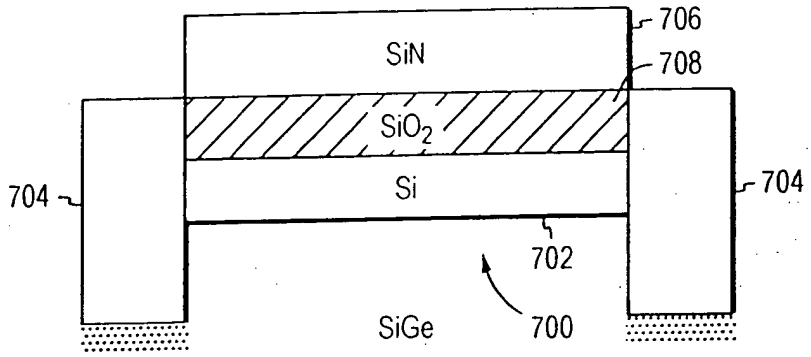
706
SiN
708
SiO_2
Si
704
704
702
SiGe
700

FIG. 7A

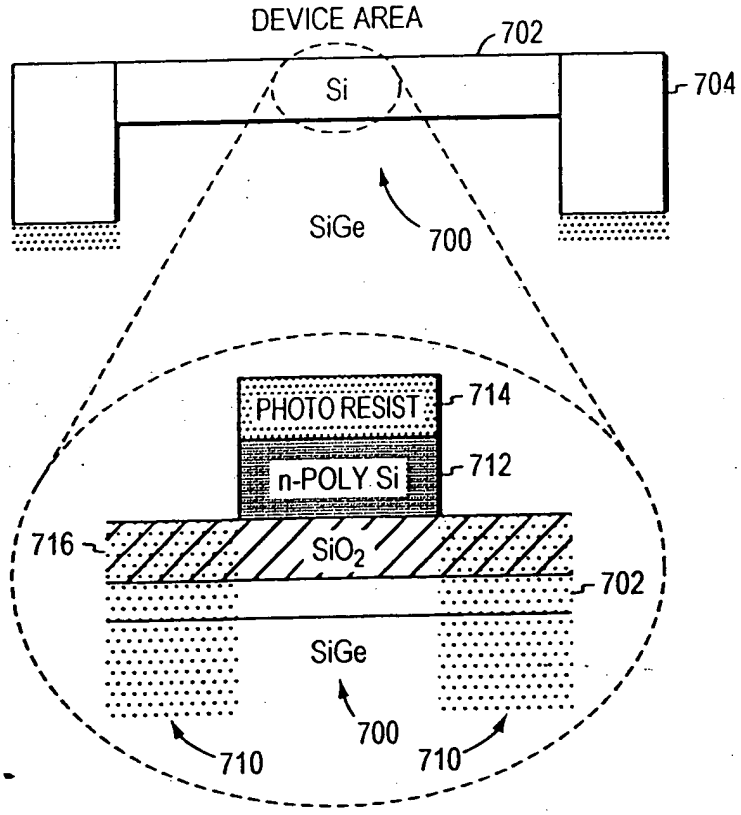
DEVICE AREA
702
Si
704
SiGe
700
PHOTO RESIST
714
n-POLY Si
712
716
SiO_2
702
SiGe
700
710
710

FIG. 7B

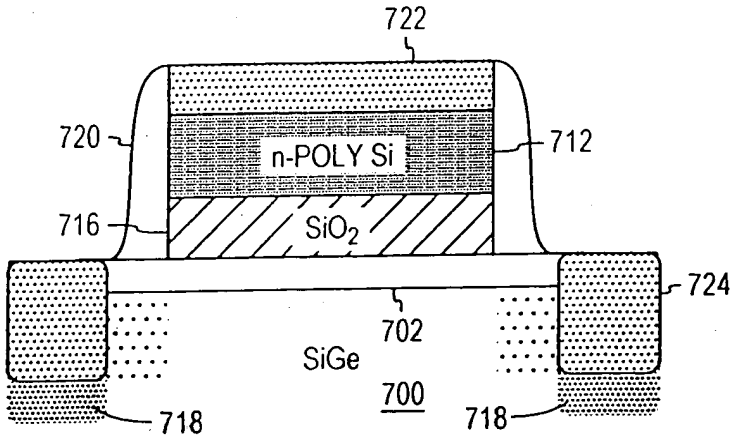
722
720
n-POLY Si
712
716
SiO_2
724
702
SiGe
700
718
718

FIG. 7C

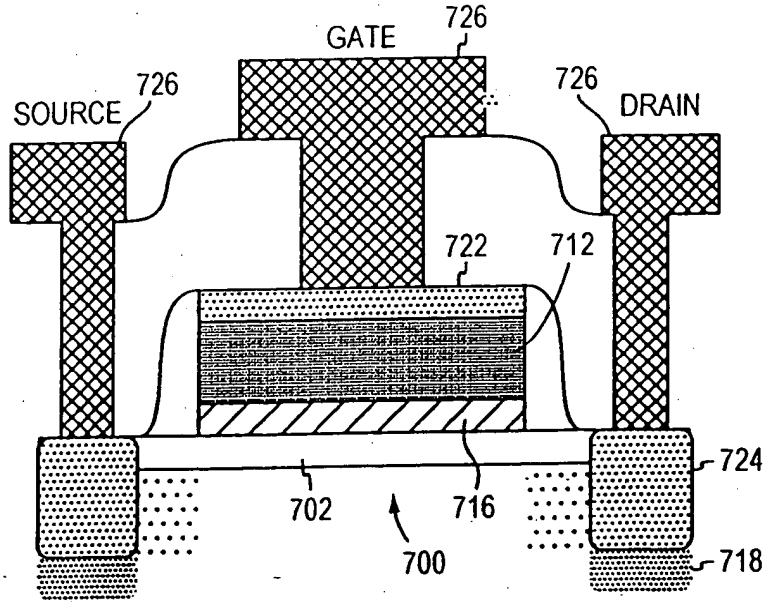
GATE
726
726
SOURCE
726
DRAIN
722
712
724
702
716
700
718

FIG. 7D

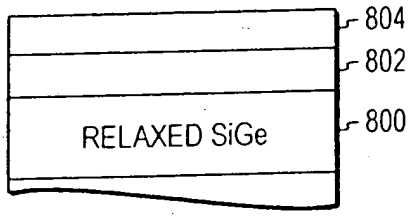

FIG. 8A

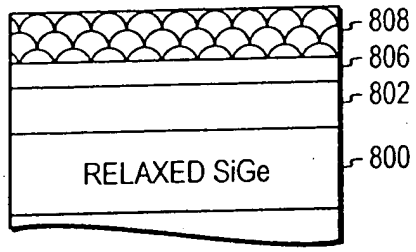

FIG. 8B

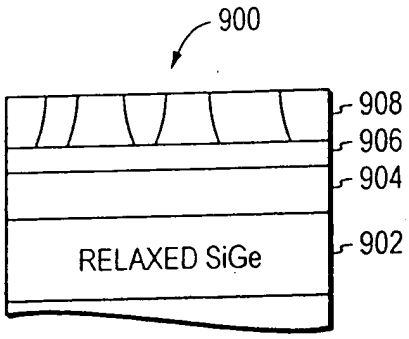

FIG. 9A

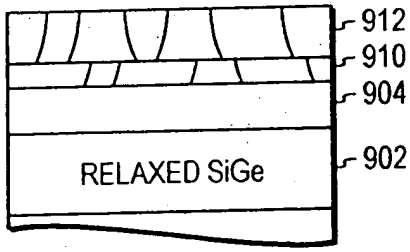

FIG. 9B

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Atty: Mark L. Beloborodov
Express Mail Mailing Label No.: EL 988705761 US
Formal Drawing Sheet 11 of 17

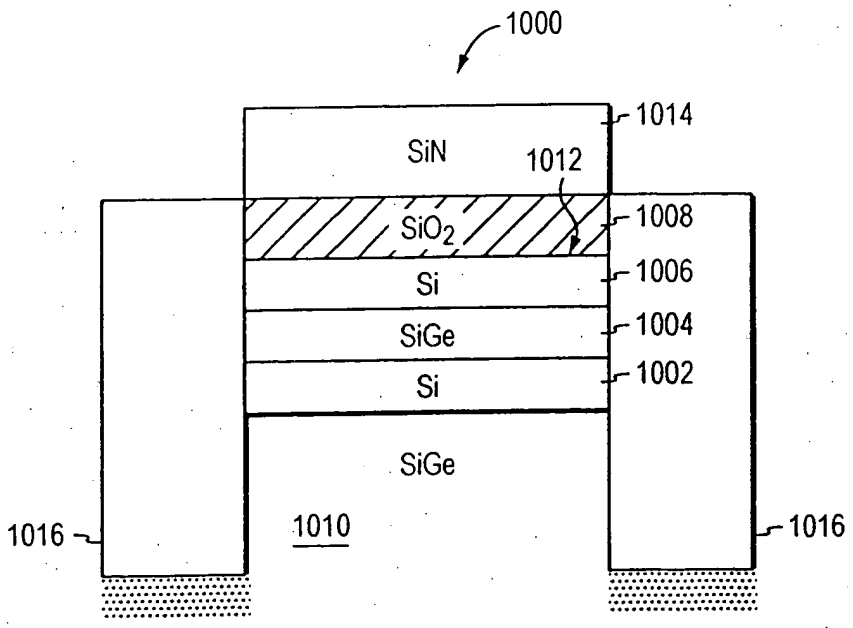

FIG. 10

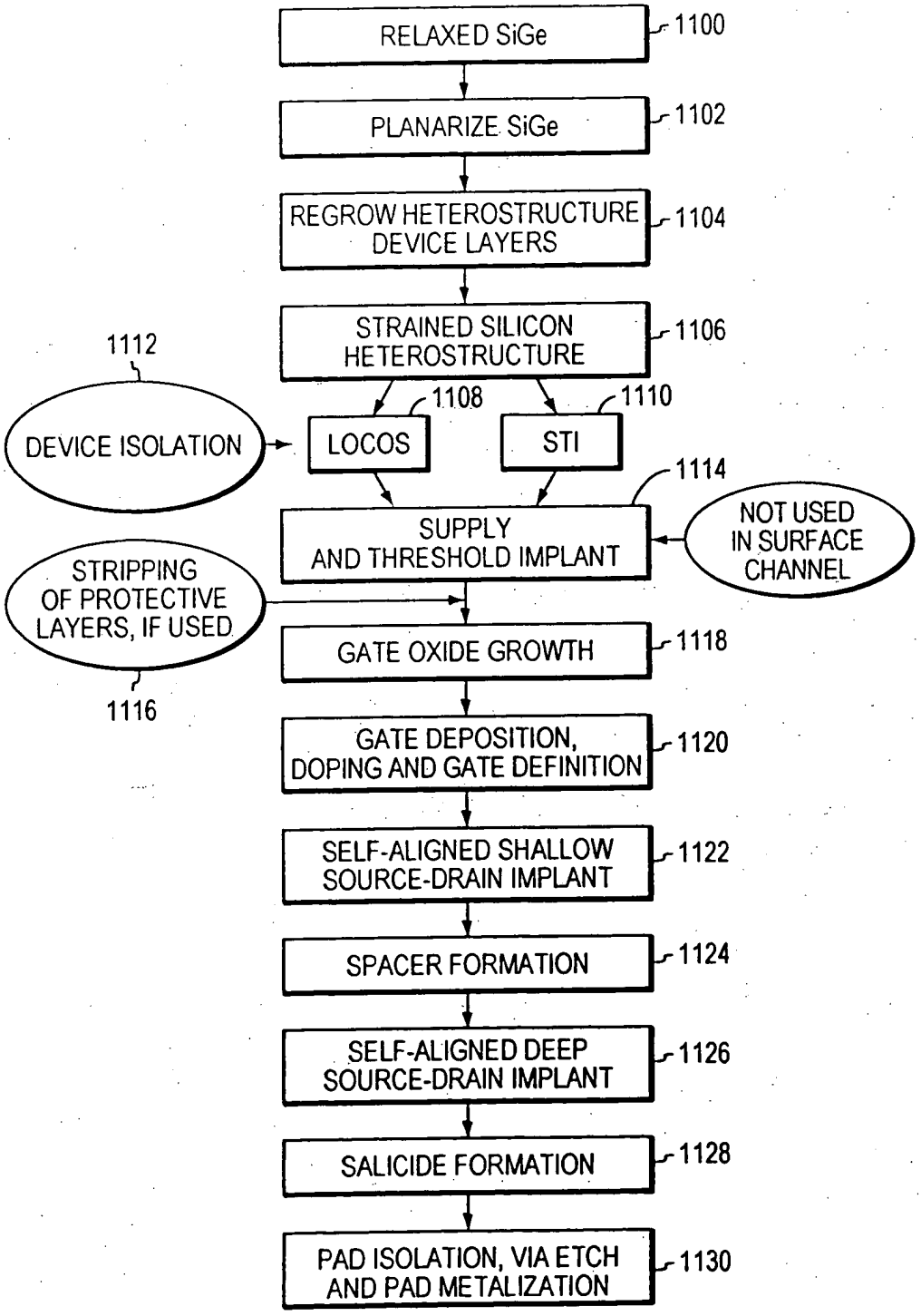
RELAXED SiGe
1100
PLANARIZE SiGe
1102
REGROW HETEROSTRUCTURE DEVICE LAYERS
1104
STRAINED SILICON HETEROSTRUCTURE
1106
1112
DEVICE ISOLATION
1108
LOCOS
1110
STI
1114
SUPPLY AND THRESHOLD IMPLANT
NOT USED IN SURFACE CHANNEL
STRIPPING OF PROTECTIVE LAYERS, IF USED
1116
GATE OXIDE GROWTH
1118
GATE DEPOSITION, DOPING AND GATE DEFINITION
1120
SELF-ALIGNED SHALLOW SOURCE-DRAIN IMPLANT
1122
SPACER FORMATION
1124
SELF-ALIGNED DEEP SOURCE-DRAIN IMPLANT
1126
SALICIDE FORMATION
1128
PAD ISOLATION, VIA ETCH AND PAD METALIZATION
1130

FIG. 11

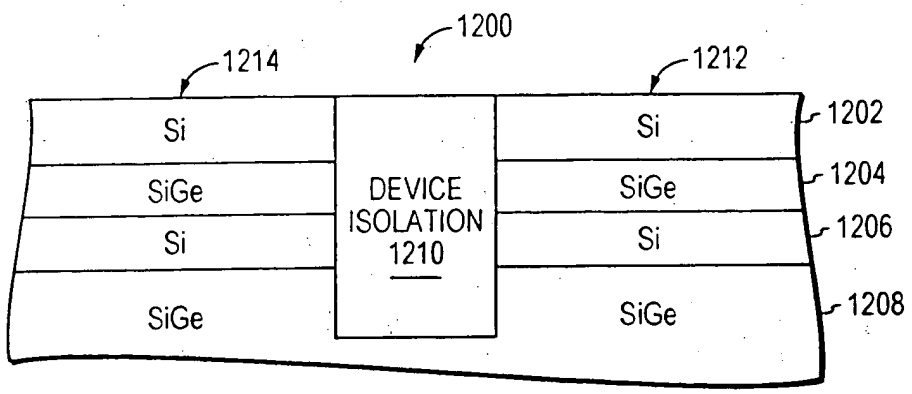

FIG. 12A

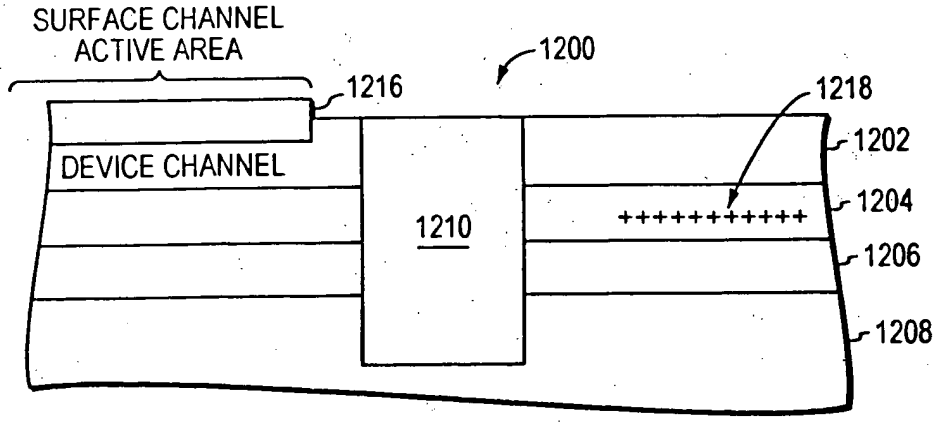

FIG. 12B

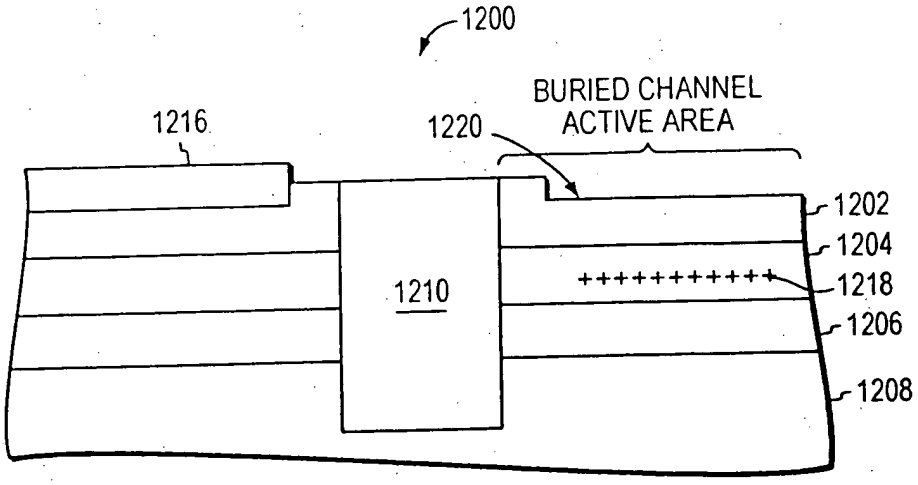

FIG. 12C

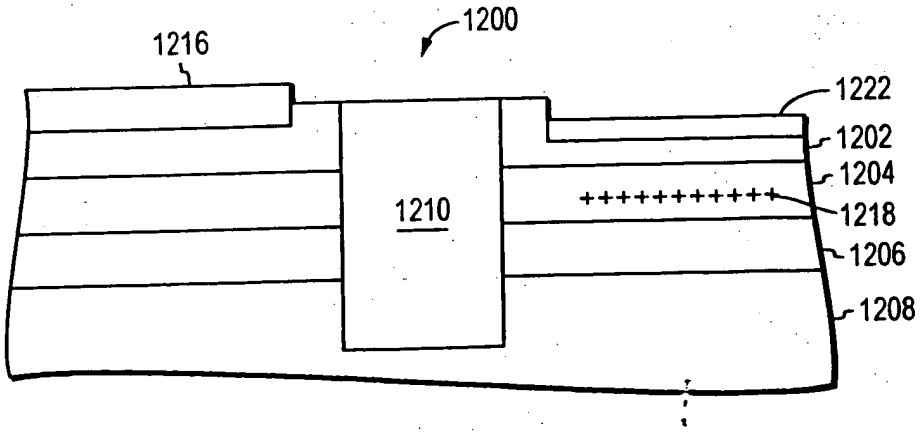

FIG. 12D

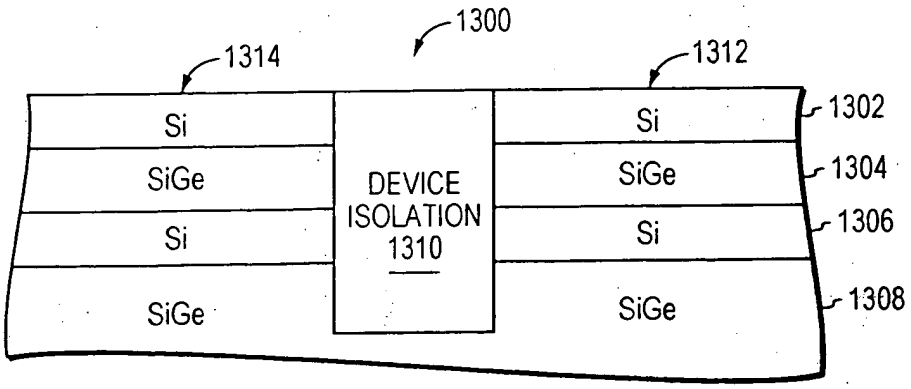

FIG. 13A

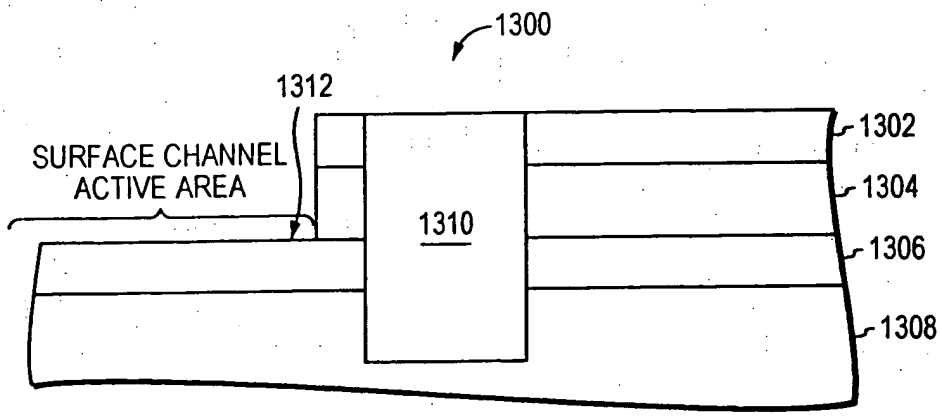

FIG. 13B

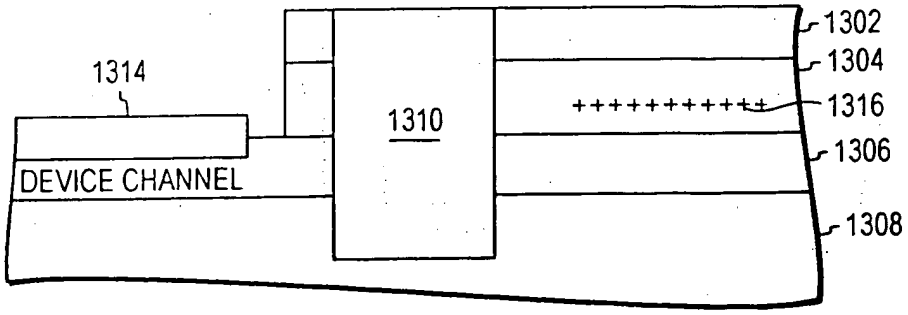

FIG. 13C

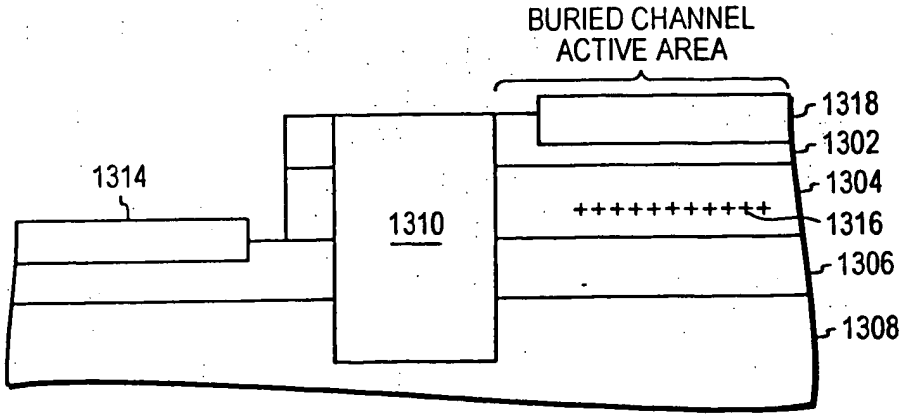

FIG. 13D

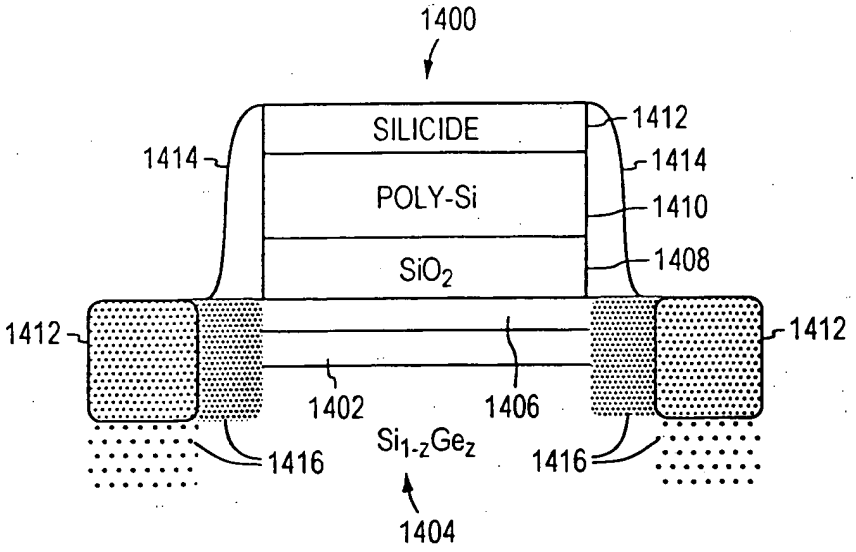

FIG. 14A

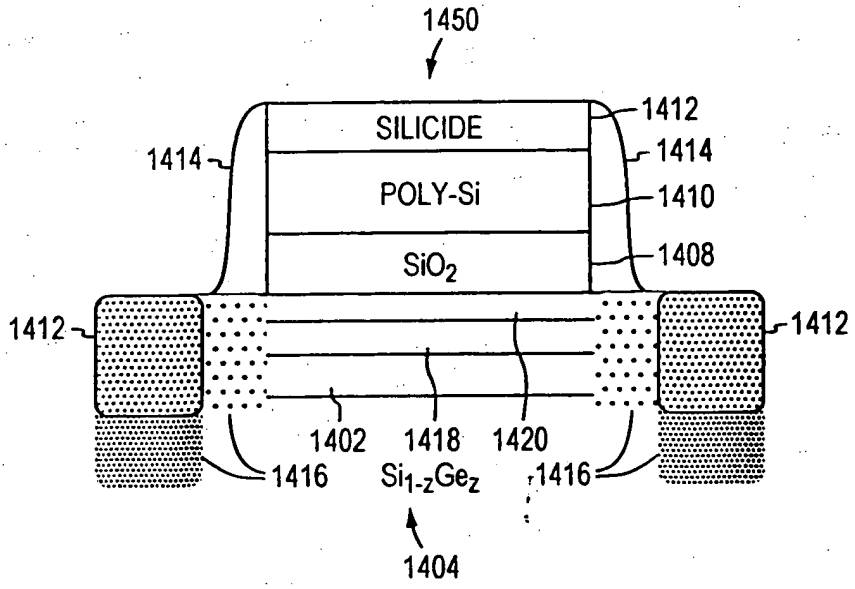

FIG. 14B